AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (currently amended) A method of induction heat treatment, comprising the steps of:

selecting an article for heat treatment having a longitudinal axis of rotation and an outer surface having an upper section, a lateral section and a lower section, and comprising a plurality of points having a plurality of normal spacings from the axis of rotation;

selecting an induction coil comprising a semi-cylindrical upper coil portion, a semi-cylindrical lateral coil portion, a semi-cylindrical lower coil portion and having a longitudinal axis, the coil ~~which is adapted to receive~~ receiving therein the article for heat treatment and ~~apply~~ producing, when energized, a ~~non-planar~~ magnetic field having a non-planar centerline ~~to the outer surface of the article~~;

placing the article within the induction coil;

rotating the article within the induction coil at a selected speed;

energizing the induction coil to apply the non-planar magnetic field and produce induction currents within the outer surface of the article for a time sufficient to induce heating of the outer surface to a heat treatment temperature (T_H) to at least a selected case depth; and

cooling the outer surface of the article to a temperature (T_C) to the selected case depth.

2. (ORIGINAL) The method of claim 1, wherein the article comprises a pearlitic/ferritic steel.

3. (ORIGINAL) The method of claim 2, wherein T_H is greater than the austenite transition temperature.

4. (ORIGINAL) The method of claim 3, wherein said step of cooling comprises quenching the article.

5. (ORIGINAL) The method of claim 4, wherein said step of cooling comprises quenching until T~ is lower than the martensite transformation temperature.

6. (currently amended) The method of claim 1, wherein the article comprises an inner ball race of a Rzeppa-~~type~~ constant velocity joint having a barrel-shaped outer surface with a plurality of longitudinally extending arch-shaped grooves formed therein.

7. (ORIGINAL) The method of claim 6, wherein the inner ball race comprises a pearlitic/ferritic steel.

8. (ORIGINAL) The method of claim 7, wherein the steel comprises AISI 1050 steel.

9. (ORIGINAL) The method of claim 7, wherein T_H is greater than the austenite transition temperature.

10. (ORIGINAL) The method of claim 9, wherein the T_H is in the range of 1700 - 2000°F.

11. (ORIGINAL) The method of claim 9, wherein said step of cooling comprises quenching the article.

12. (ORIGINAL) The method of claim 11, wherein T_C is less than the martensite start temperature and greater than the martensite finish temperature.

13. (ORIGINAL) The method of claim 12, further comprising stopping the quenching when the outer surface of the inner race is less than or equal to T_C to the selected case depth, and then permitting the inner race to cool under ambient conditions.

14. (ORIGINAL) The method of claim 1, wherein during the step of energizing, the upper coil portion produces an upper magnetic field that is adapted to act on the upper section of the outer surface, the lateral coil portion produces a lateral magnetic field that is adapted to act on the lateral section of the outer surface, and the lower coil portion produces a lower magnetic field that is adapted to act on the lower section of the outer surface.

15. (ORIGINAL) The method of claim 14, wherein the step of energizing comprises the application of an electric current to the induction coil having a frequency in the range of about 7.5 - 12 kHz.

16. (currently amended) A method of induction heat treatment of an outer surface of an inner ball race of a Rzeppa ~~type~~ constant velocity joint, said outer surface also having a plurality of ball races formed therein, comprising the steps of:

selecting an induction coil having a longitudinal axis, a semi-cylindrical upper coil portion, a semi-cylindrical lateral coil portion, and a semi-cylindrical lower coil portion, that is adapted to receive therein the inner race and to apply a ~~non-planar~~ magnetic field having a non-planar centerline to the outer surface ~~thereof~~ of the race;

selecting an induction coil comprising a semi-cylindrical upper coil portion, a semi-cylindrical lateral coil portion, a semi-cylindrical lower coil portion and having a longitudinal axis, the coil ~~which is adapted to receive~~ receiving therein the article for heat treatment and ~~apply~~ producing, when energized, a ~~non-planar~~ magnetic field having a non-planar centerline ~~to the outer surface of the article~~;

placing the article within the induction coil;

rotating the inner race within the induction coil at a selected speed;

energizing the induction coil to apply the non-planar magnetic field and produce induction currents within the outer surface of the inner race for a time sufficient to induce heating of the outer surface to a heat treatment temperature (T_H) to at least a selected case depth; and

cooling the outer surface of the article to a temperature (T_C) to the selected case depth.

17. (ORIGINAL) The method of claim 16, wherein the inner race comprises a pearlitic/ferritic steel.

18. (ORIGINAL) The method of claim 17, wherein the steel comprises AISI 1050 steel.

19. (ORIGINAL) The method of claim 17, wherein T_H is greater than the austenite transition temperature.

20. (ORIGINAL) The method of claim 19, wherein T_H is in the range of 1700 - 2000°F.

21. (ORIGINAL) The method of claim 19, wherein said step of cooling comprises quenching the article.

22. (ORIGINAL) The method of claim 21, wherein said step of cooling comprises quenching until T_C is lower than the martensite start temperature.

23. (ORIGINAL) The method of claim 22, wherein T_C is greater than the martensite finish temperature.

24. (ORIGINAL) The method of claim 23, further comprising stopping said step of cooling by quenching when the outer surface of the inner race is less than or equal to T_C to the selected case depth, and permitting the inner race to cool under ambient conditions.

Claims 25 – 35 (WITHDRAWN)